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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/643,136	08/18/2003	Mark Kleshock	TAZ-237	3298

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EXAMINER	
DHINGRA, RAKESH KUMAR	
ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 11/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/643,136	KLESHOCK ET AL.	
	Examiner	Art Unit	
	Rakesh K. Dhingra	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *03* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-62* is/are pending in the application.

4a) Of the above claim(s) *14-35 and 52-62* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 36-51* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 August 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/03,10/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group I (apparatus) Claims 1-13, 20-62 in the reply filed on 10/03/2005 is acknowledged. Further, during a telephone call with Joseph R. Jordan on 10/20/2005, applicant has elected sub-combination II (upper source shield), claims 36-51 from Group I invention. Claims 14-35, 52-62 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention/sub-combination, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 10/03/2005.

Drawings

1) The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: Figure 3: Reference number 44 not shown in drawing as mentioned in paragraph 0039 of the specification.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities:

1) Paragraph 0044 - it is suggested to verify correctness of "angular feature 431" since as per Figure 4B and also described as such in Paragraph 0046 of the specification, Reference number 431 is thickness of the bottom ring.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 36, 37 are rejected under 35 U.S.C. 102(e) as being anticipated by Gung et al (US PGPub. No. 2005/0199491).

Regarding Claims 1-3: Gung et al teach an apparatus (Figures 9,11,12) that has a chamber shield assembly (162, 200) for a semiconductor-wafer vacuum processing apparatus comprising:

a plurality of shields (162, 200) made of high thermal conductivity material (Aluminum) to provide high thermal conductivity throughout each shield,

each shield having a mounting surface (168, 202) configured to provide intimate thermal contact with the wall of a chamber of the apparatus when secured thereto, the mounting surface having sufficient area to provide high thermal conductivity between the shield and the wall of the chamber (Paragraphs 0050 –0053, 0057).

Regarding Claim 36: Gung et al teach (per Figures 9, 11) that the inner (upper) shield 162 is a cylindrical element and comprises a top ring, a sloped ring, bottom ring and a

mounting element 168 (Paragraphs 0050-0052). Gung et al further teach (without explicitly naming the individual surfaces) per (Figures 9,11) that the top ring comprises inner surface, top surface, and an outer surface; sloped ring comprises an inner surface coupled to the inner surface of the top ring, and an outer surface coupled to the outer surface of the top ring, bottom ring comprises inner surface coupled to the inner surface of the sloped ring, an outer surface coupled to the outer surface of sloped ring, and a bottom surface coupled to the inner surface and the outer surface; and mounting element comprises a mating surface coupled to the outer surface of the sloped ring, an outer surface coupled to the top surface and the bottom surface of the mounting element, and a lower surface coupled to the bottom surface of the mounting element and the outer surface of bottom ring.

Regarding Claim 37: Gung et al teach that inner shield is made from Aluminum. Further as per drawing of the shield it can be manufactured from a single block of material (Paragraph 0057).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under

37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 4, 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gung et al (US PGPub. No. 2005/0199491) in view of Drewery et al (US PGPub. No. 2002/0104751).

Regarding Claims 4, 5: Gung et al teach all limitations of the claims 1, 3 (as explained above) including that the shields are configured to mount in a co-operative relationship in the chamber.

Gung et al do not teach gaps between shields.

Drewery et al teach an apparatus (Figure 22) that has a sputter shield assembly with shields 136, 137 wherein the shields are configured to mount in a cooperating relationship and wherein the shields float mechanically relative to each other and gaps are dimensioned to accommodate different thermal expansion due to different heating (Paragraphs 0020, 0096, 0097).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use shields with proper gaps as taught by Drewery et al in the apparatus of Gung et al to enable proper pumping during sputtering process (Paragraph 0097).

Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gung et al (US PGPub. No. 2005/0199491) in view of Gopalraja et al (US PGPub. No. 2004/0140196).

Regarding Claim 6: Gung et al teach all limitations of the claims 1 (as explained above).

Gung et al do not teach chamber with temperature controlled walls.

Gopalraja et al teach an apparatus (Figure 3A) that has a chamber 106 with a shield 128 to protect the wall from sputtered material and where the temperature of chamber wall is controlled by temperature control instruction set 348 and a controller 303 (Paragraphs 0031, 0047).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use vacuum chamber with shield and having temperature controlled wall as taught by Gopalraja et al in the apparatus of Gung et al to provide better control of sputtering process.

Regarding Claims 7, 8: Gung et al in view of Gopalraja et al teach all limitations of the claims as explained above.

Claims 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gung et al (US PGPub. No. 2005/0199491) in view of Gopalraja et al (US PGPub. No. 2004/0140196) as applied to Claims 6, 8 and further in view of Drewery et al (US PGPub. No. 2002/0104751).

Regarding Claims 9-11: Gung et al in view of Gopalraja et al and Drewery et al teach all limitations of the claims as explained above.

Claims 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gung et al (US PGPub. No. 2005/0199491) in view of Gopalraja et al (US PGPub. No. 2004/0140196) as applied to Claim 6 and further in view of Hosokawa et al (US Patent No. 5,518,593).

Regarding Claim 12: Gung et al in view of Gopalraja et al teach all limitations of the claim except radiant heaters to heat the shield.

Hosokawa et al teach an apparatus (Figures 17,18) that has a shield assembly 46 and radiant heaters 76-79 for heating the shields (Column 10, line 60 to Column 11, line 20). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use radiant heaters for chamber shield as taught by Hosokawa et al in the apparatus of Gung et al in view of Gopalraja et al to enable eliminate detrimental stresses in the sputter deposited material (Column 3, line 60 to Column 4, line 5).

Claims 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gung et al (US PGPub. No. 2005/0199491) in view of Gopalraja et al (US PGPub. No. 2004/0140196) as applied to Claim 6 and further in view of Stevens et al (US PGPub. No. 2005/0199489).

Regarding Claim 13: Gung et al in view of Gopalraja et al teach all limitations of the claim except radiant lamps to heat the shield.

Stevens et al teach an apparatus (Figure 5) that has a chamber 102, with a shield 138 that is heated by radiant lamps 138b installed around the chamber and oriented parallel to chamber axis (Paragraphs 0070, 0071).
Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use radiant lamps for heating the shield as taught by Stevens et al in the apparatus of Gung et al in view of Gopalraja et al to minimize peeling-off of the sputtered material from the surface of the shield.

Claims 38, 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gung et al (US PGPub. No. 2005/0199491) in view of Lawson et al (US PGPub. No. 2004/0020759).

Regarding Claims 38, 49: Gung et al teach all limitations of the claim except the shield material.

Lawson et al teach an apparatus (Figures 2, 2a) that has a chamber 18 with shields 40, 40a, which are made from Aluminum 6061-T6. Lawson et al also teach that surfaces of shields that come in line-of-sight of the target are abrasive (grit) blasted to ensure that that deposits that occur on these surfaces are less likely to flake-off during processing (Paragraph 0053).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use shield made from Aluminum 6061-T6 as taught by Lawson et al in the apparatus of Gung et al prevent deposition of coating material on cathode assembly (Paragraph 0017).

Claims 39-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gung et al (US PGPub. No. 2005/0199491) in view of Tepman (US Patent No. 5,951,775) and Eckerson (US PGPub. No. 2004/0245098).

Regarding Claims 40: Gung et al teach all limitations of the claims except for shape and dimensions of the upper shield.

Tepman et al teach an apparatus (Figure 2) that has a sputter chamber 2 with a deposition shield 10 that has a mounting portion (mounting element) 11 comprising a

plurality of holes (using screws 12) extending from mating surface to bottom surface (Column 3, lines 6-20).

Though Tepman does not teach size of hole but he teaches that configuration of shield conforms to internal shape of chamber (Abstract).

Further Eckerson teach an apparatus (Figures 1-3) that has a processing chamber 110 and has shield 152. Eckerson also teaches that dimensions of shields are materially linked with the processes performed in the chamber (Paragraph 0005).
Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use upper shield shape and configuration as taught by Tepman and Eckerson in the apparatus of Gung et al to eliminate build-up of deposits as per process performed and also to enable easy removability of the shield.
Further it has been held in courts (Case law):

"It is well settled that determination of optimum values of cause effective variables such as these process parameters is within the skill of one practicing in the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980)."

"It would have been obvious to one having ordinary skill in the art to have determined the optimum value of a cause effective variable such as through routine experimentation in the absence of a showing of criticality. *In re Woodruff*, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990)."

"Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. It would have been obvious to one having ordinary skill in the art to have determined the optimum values of the relevant process parameters through routine experimentation in the absence of a showing of criticality. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955)."

Regarding Claims 39, 41-48: Gung et al in view of Tepman and Eckerson teach all limitations of the claims as explained above.

Claims 50, 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gung et al (US PGPub. No. 2005/0199491) in view of Nishimoto et al (US PGPub. No. 2004/0173155).

Regarding Claims 50,51: Gung et al teach all limitations of the claim except coating on upper shield surfaces.

Nishimoto et al teach an apparatus (Figure 1) that has a plasma chamber 10 with deposition shield 18 whose exposed surfaces (exposed to deposition) are given protective barrier coating of Yttria by spray coating techniques (Paragraphs 0049-0051).

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to give protective coating on shield as taught by Nishimoto et al in the apparatus of Gung et al to improve durability of the exposed surfaces.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

1) Miller et al (US PGPub. No. 2004/0031680) teach an apparatus (Figure 2) that has a vacuum chamber 52, a target 56 and inner and upper shields 64, 66 respectively.

2) Wilke et al (US Patent No. 6,312,568) teach an apparatus (Figure 1) that has a chamber enclosure 102, a target 104 and also has an upper shield 140 and a lower shield 132.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Rakesh Dhingra

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